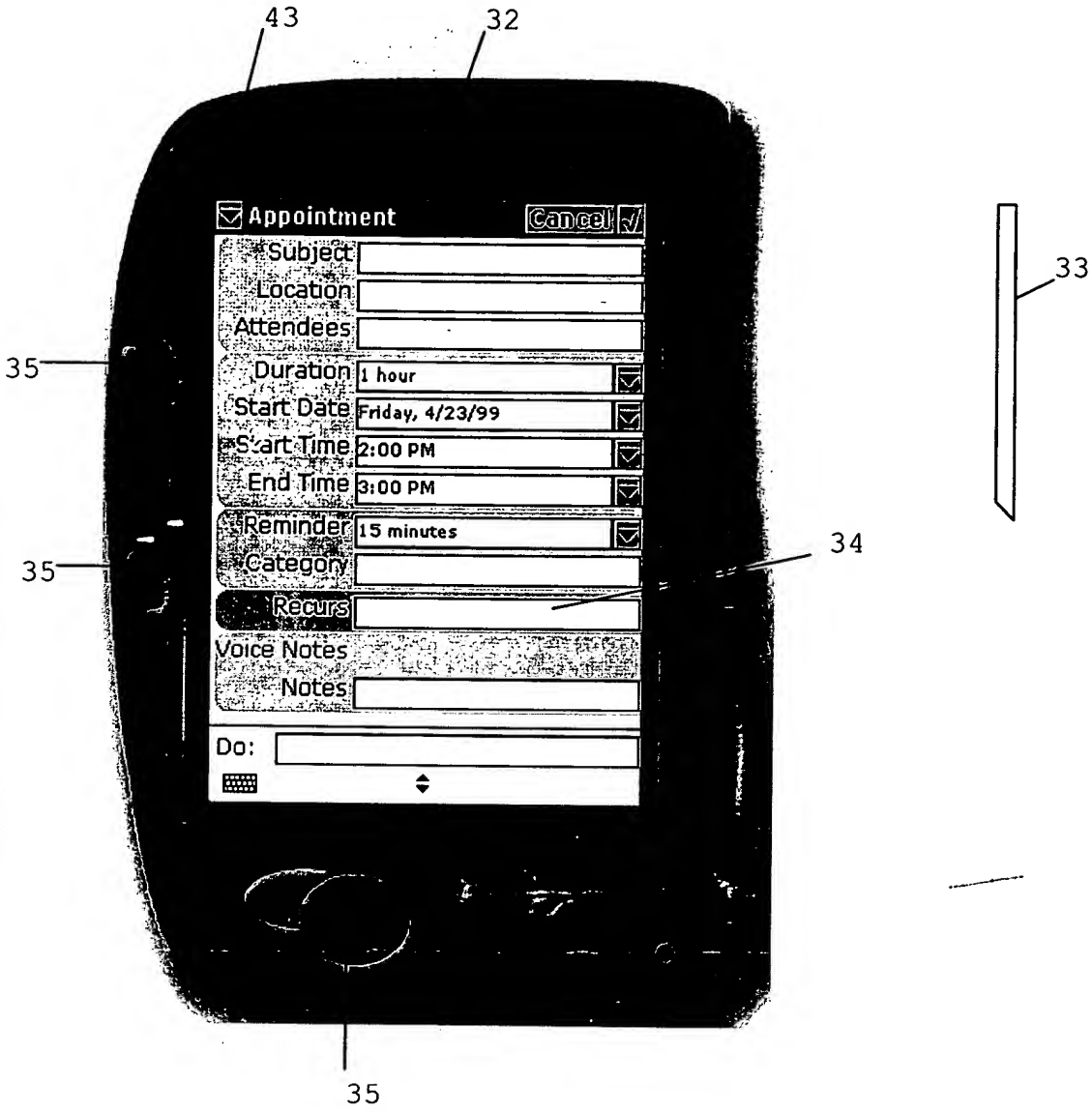
43
32
Appointment
Cancel
*Subject
Location
Attendees
Duration
1 hour
Start Date
Friday, 4/23/99
*Start Time
2:00 PM
End Time
3:00 PM
Reminder
15 minutes
*Category
Recurs
Voice Notes
Notes
Do:
35
35
35
33
34

FIG. 1

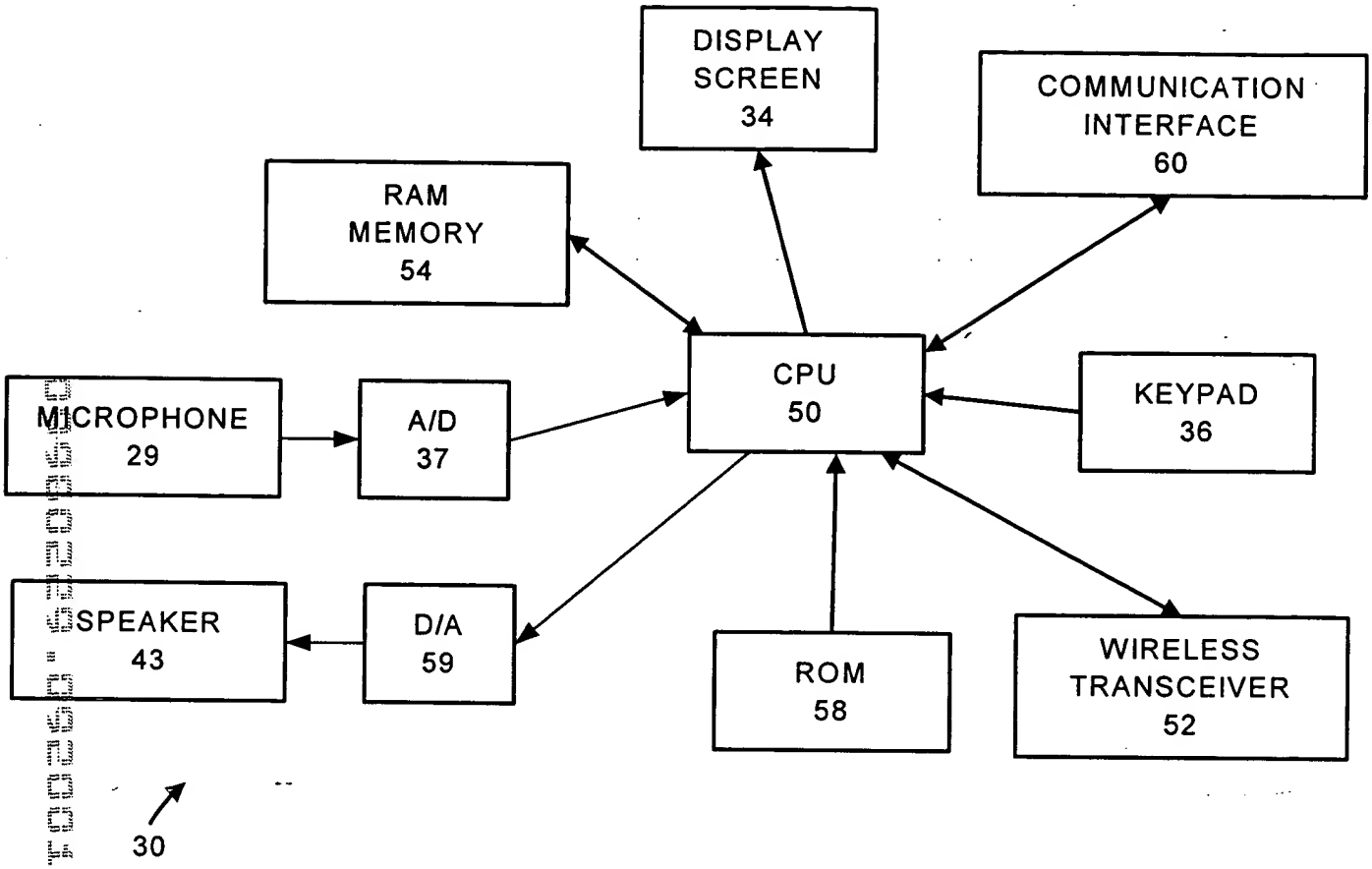
DISPLAY SCREEN 34
COMMUNICATION INTERFACE 60
RAM MEMORY 54
CPU 50
KEYPAD 36
MICROPHONE 29
A/D 37
SPEAKER 43
D/A 59
ROM 58
WIRELESS TRANSCEIVER 52
30

FIG.2

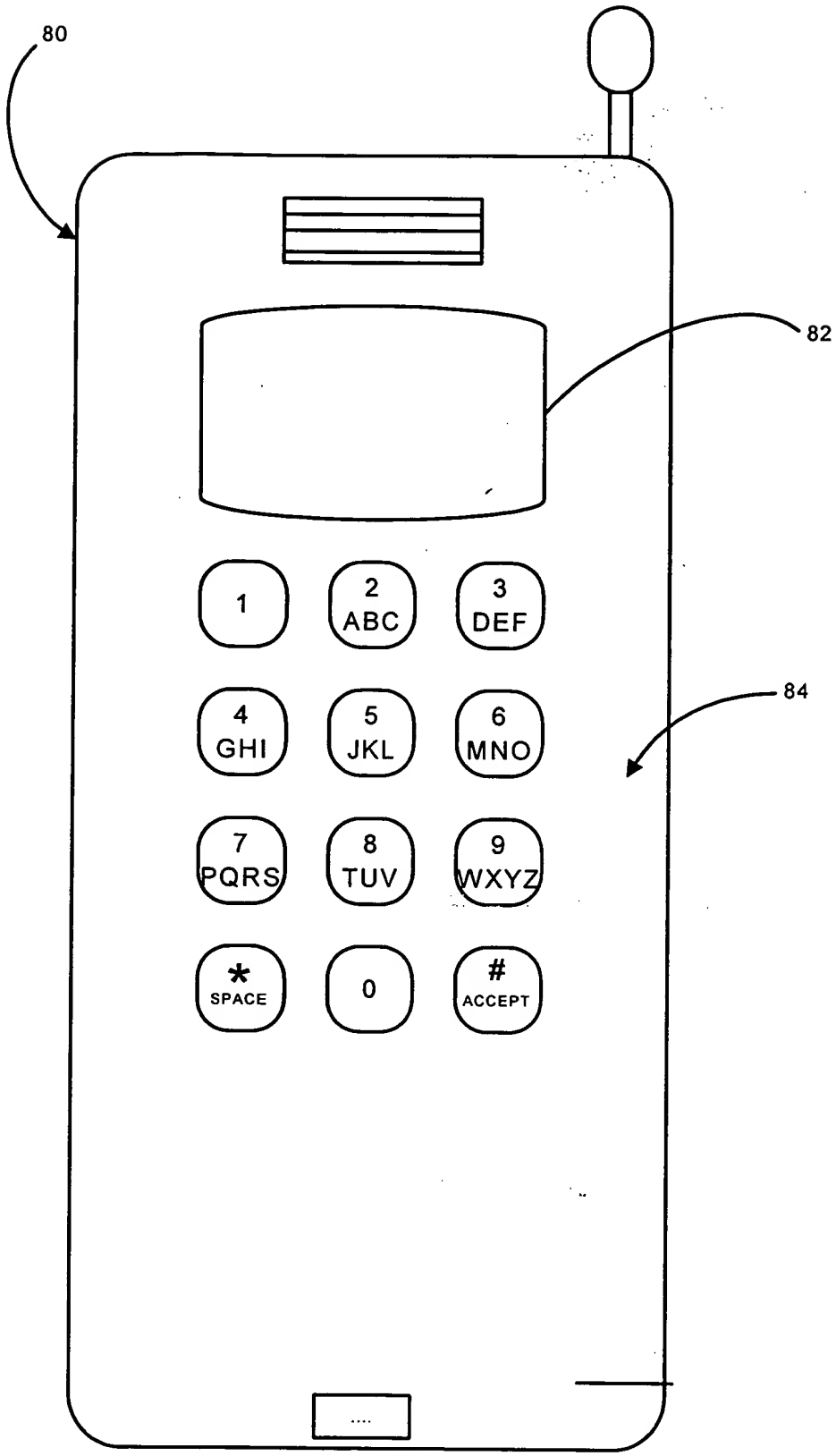
80
82
84
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
* SPACE
0
# ACCEPT

FIG. 3

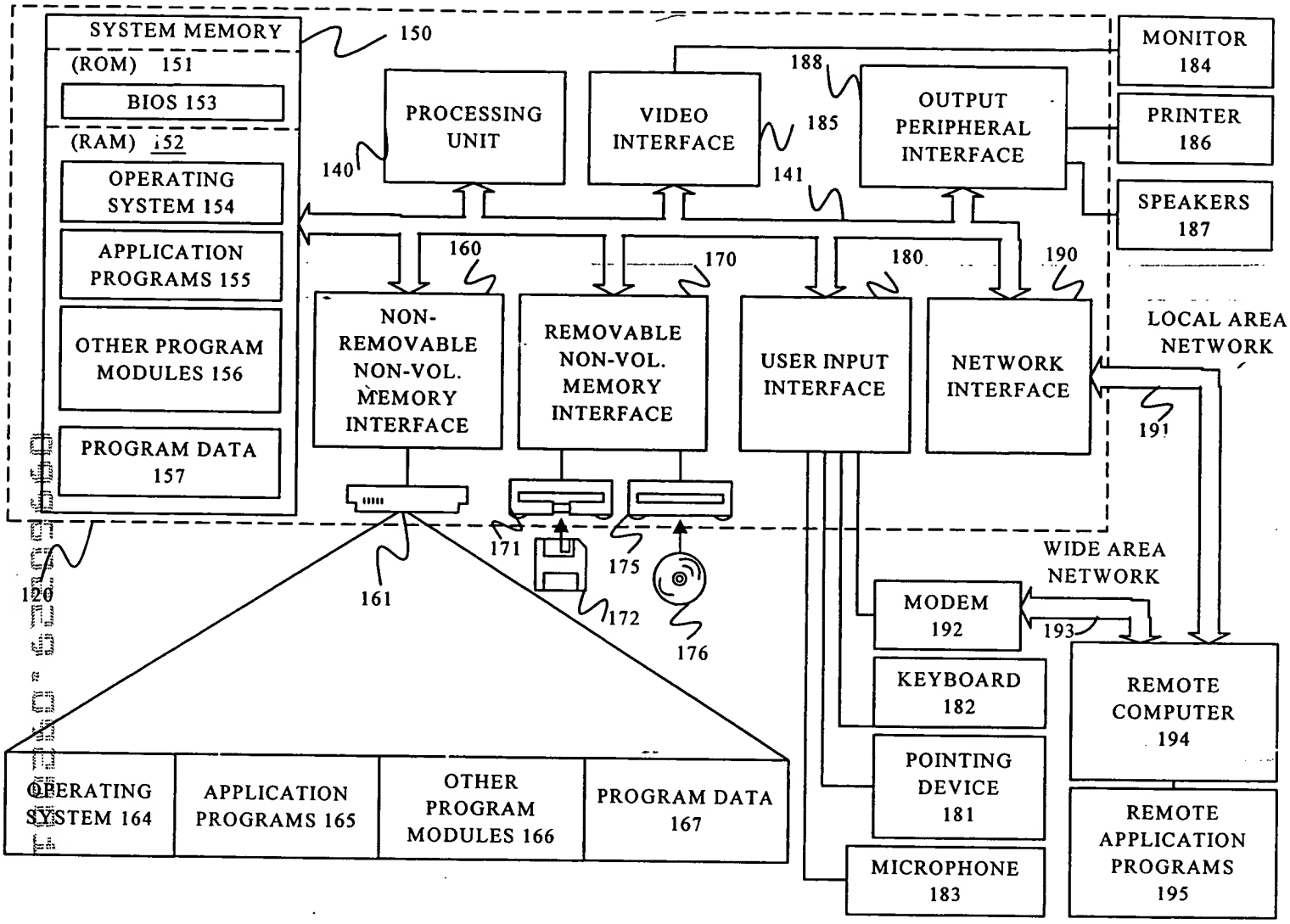
SYSTEM MEMORY
150
(ROM) 151
BIOS 153
(RAM) 152
OPERATING SYSTEM 154
APPLICATION PROGRAMS 155
OTHER PROGRAM MODULES 156
PROGRAM DATA 157
PROCESSING UNIT
140
VIDEO INTERFACE
188
185
OUTPUT PERIPHERAL INTERFACE
141
MONITOR 184
PRINTER 186
SPEAKERS 187
160
170
180
190
NON-REMOVABLE NON-VOL. MEMORY INTERFACE
REMOVABLE NON-VOL. MEMORY INTERFACE
USER INPUT INTERFACE
NETWORK INTERFACE
LOCAL AREA NETWORK
191
120
161
171
172
175
176
WIDE AREA NETWORK
MODEM 192
193
KEYBOARD 182
POINTING DEVICE 181
MICROPHONE 183
REMOTE COMPUTER 194
REMOTE APPLICATION PROGRAMS 195
OPERATING SYSTEM 164
APPLICATION PROGRAMS 165
OTHER PROGRAM MODULES 166
PROGRAM DATA 167

FIG. 4

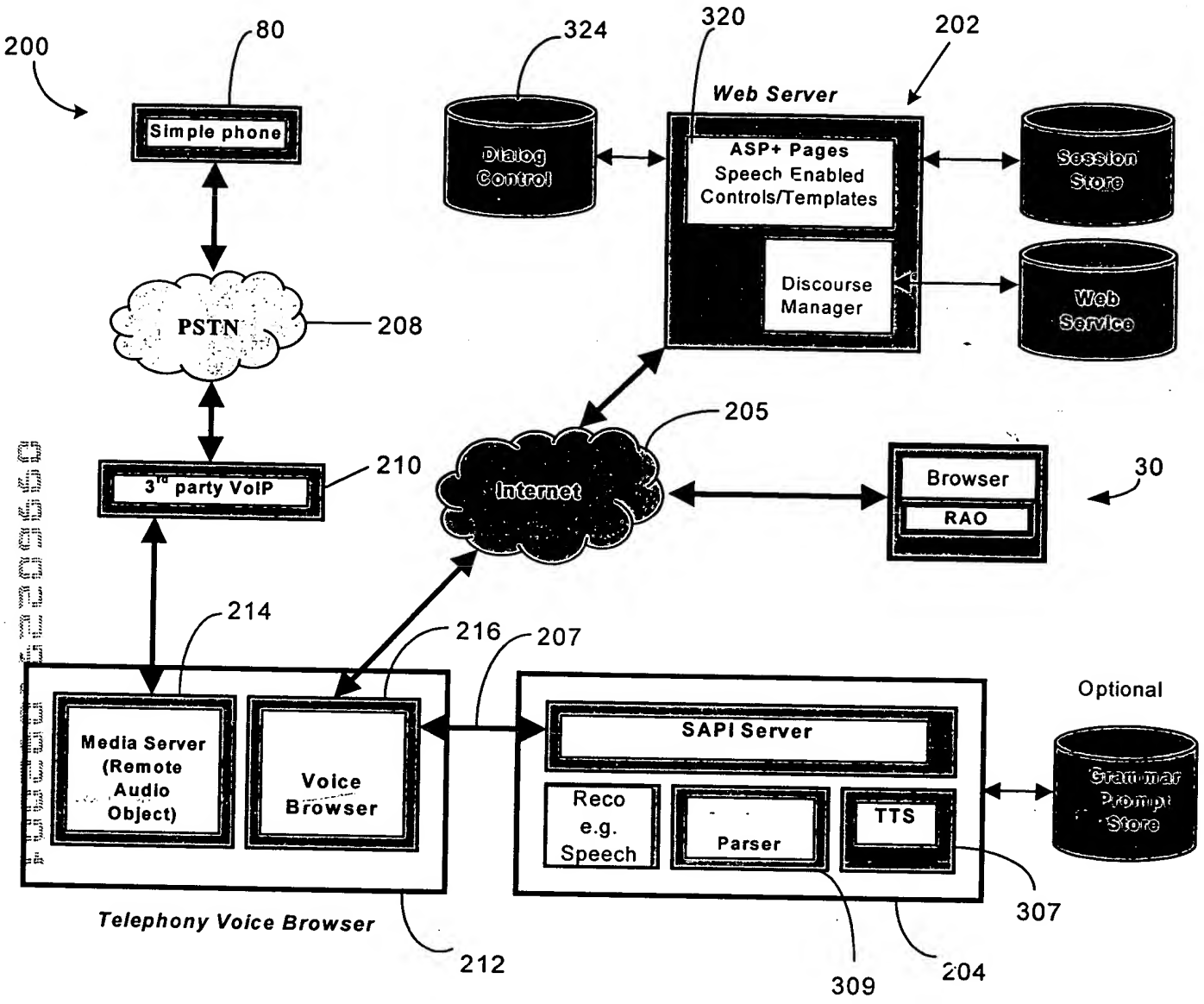
200
80
Simple phone
PSTN
208
3rd party VoIP
210
214
216
207
324
320
202
Web Server
Dialog Control
ASP+ Pages
Speech Enabled
Controls/Templates
Discourse
Manager
Session Store
Web Service
205
Internet
Browser
RAO
30
Media Server
(Remote
Audio
Object)
Voice
Browser
Telephony Voice Browser
212
SAPI Server
Reco
e.g.
Speech
Parser
TTS
Optional
Grammar
Prompt
Store
307
309
204

FIG. 5

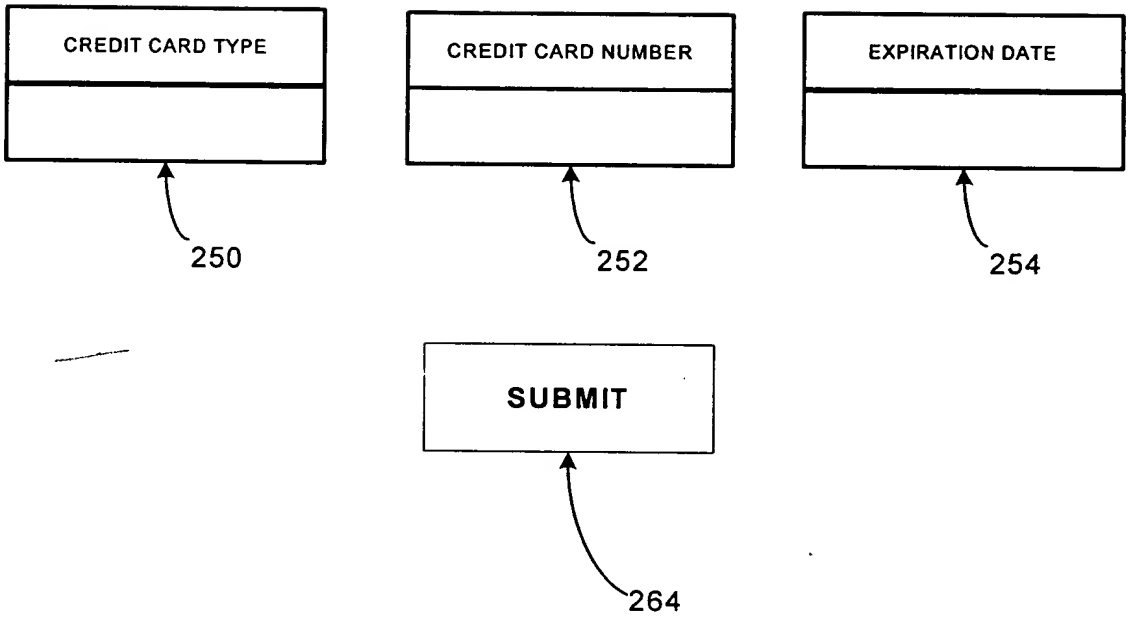
CREDIT CARD TYPE
CREDIT CARD NUMBER
EXPIRATION DATE
250
252
254
SUBMIT
264

FIG. 6

```
<html>
  <form id="get_card_info" method="post" action="http://payment.asp">
    <select name="card_type">
      <option value="amex">American Express</option>
      <option value="visa">Visa</option>
      <option value="ms">MasterCard</option>
    </select>
    <input type="text" name="card_num" width="30"
      onChange="handle()" />
    <input type="text" name="expiry_date" />
    <input type="submit" value="Submit" onClick="verify()" />
  </form>
  <script><![CDATA[
        function handle() {
          if (get_card_info.card_type.value == "amex") {
            if (get_card_info.card_num.length != 15)
              alert ("amex should have 15 digits");
          } else
            if (get_card_info.card_num.length != 16)
              alert ("visa and master should have 16 digits");
        }
        function verify() {
          var flag = window.confirm("submit the credit card info?");
          if (flag)
            get_card_info.submit();
        }
    ]]>
  </script>
</html>
```

260

262

FIG. 7

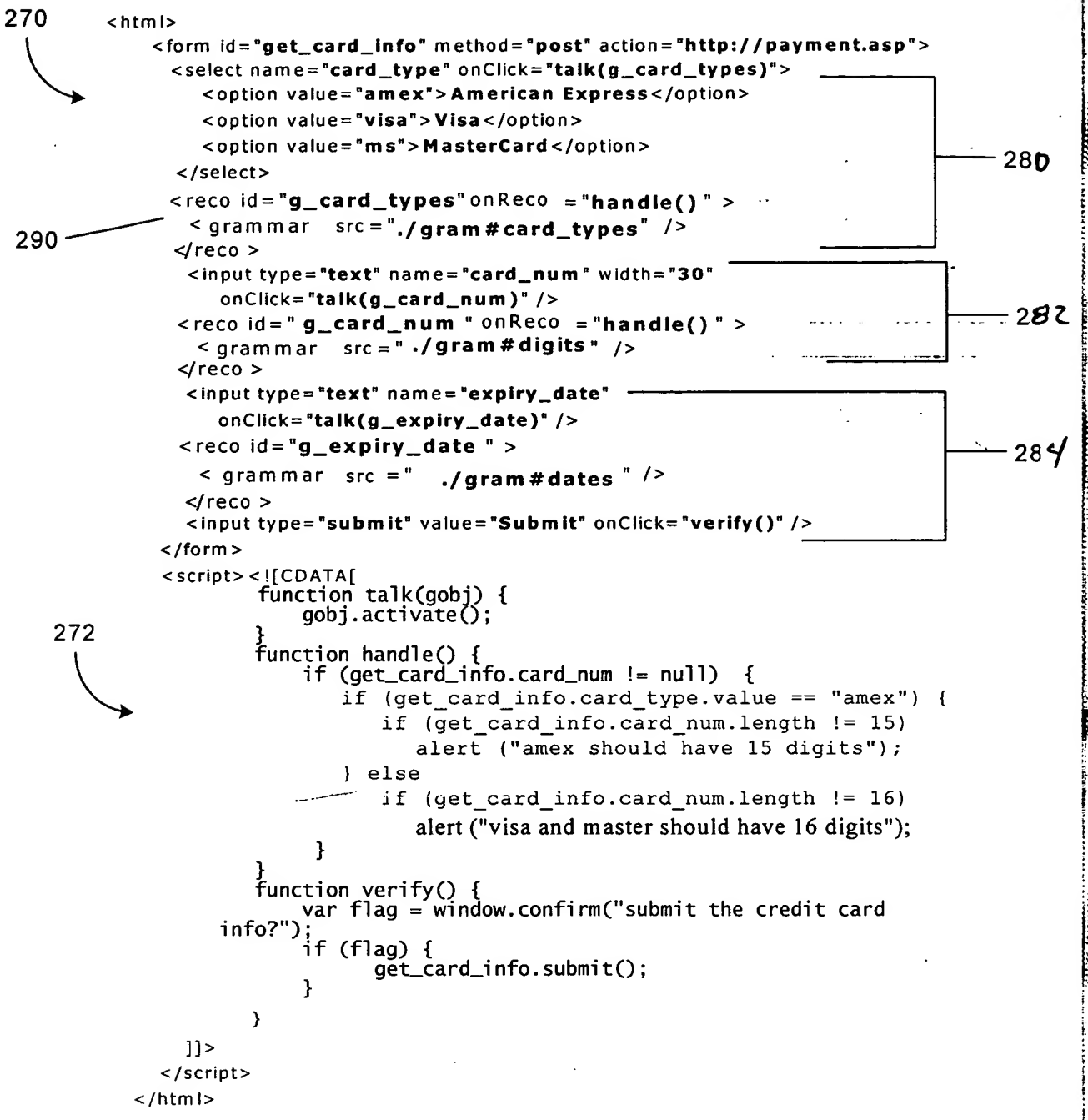
270
290
280
282
284
272
<html>
<form id="get_card_info" method="post" action="http://payment.asp">
<select name="card_type" onClick="talk(g_card_types)">
<option value="amex">American Express</option>
<option value="visa">Visa</option>
<option value="ms">MasterCard</option>
</select>
<reco id="g_card_types" onReco ="handle()" >
<grammar src="./gram#card_types" />
</reco >
<input type="text" name="card_num" width="30"
onClick="talk(g_card_num)" />
<reco id="g_card_num" onReco ="handle()" >
<grammar src="./gram#digits" />
</reco >
<input type="text" name="expiry_date"
onClick="talk(g_expiry_date)" />
<reco id="g_expiry_date" >
<grammar src=" ./gram#dates" />
</reco >
<input type="submit" value="Submit" onClick="verify()" />
</form>
<script><![CDATA[
function talk(gobj) {
gobj.activate();
}
function handle() {
if (get_card_info.card_num != null) {
if (get_card_info.card_type.value == "amex") {
if (get_card_info.card_num.length != 15)
alert ("amex should have 15 digits");
} else
if (get_card_info.card_num.length != 16)
alert ("visa and master should have 16 digits");
}
}
function verify() {
var flag = window.confirm("submit the credit card
info?");
if (flag) {
get_card_info.submit();
}
}
]]>
</script>
</html>

FIG. 8

```
< body >
    < form id =" get_card_info " method ="post" action =" http://payment.asp "
        onActivate =" welcom() ">
     < prompt id =" p_welcome "> We now need your credit card </ prompt >
     < prompt id =" p_mumble "> I didn't understand you </ prompt >
     < prompt id ="p _card_type " bargein ="true"> What credit card would you
use? </ prompt >
     < prompt id =" p_card_num " bargein ="true"> Please say the number" </ prompt >
     < prompt id =" p_expiry_date " bargein ="true"> What is the expiration
date? </ prompt >
     < prompt id =" p_content ">
          I have your  < value select =" card_type " />  < value select =" card_num " />
          with expiration date
       < value select =" expiry_date " />
     </ prompt >
     < prompt id =" p_confirm "> Is this correct? </ prompt >
     < reco id =" g_card_types "      onNoReco =" mumble(this, 2) " >
      onReco =" _handle(this, card_type) " />
     < grammar src =" ./gram#card_types "
     </reco >
     < reco id =" g_card_num " onNoReco =" mumble(this, 1) ">
      onReco =" _handle(this, card_num) " />
      < grammar src =" ./gram#digits " />
     </reco >
     < reco id =" g_expiry_date " onNoReco =" mumble(this, 1) ">
      onReco =" _handle(this, expiry_date) " audio ="rao " />
       < grammar src =" ./gram#dates " />
     </reco >
    < reco id =" confirmation "    onReco    =" confirmed(this) " />
       < grammar src =" ./gram#yesno " />
     </reco >
     < select name =" card_type ">
         < option value ="amex "> American Express </ option >
         < option value ="visa "> Visa </ option >
         < option value ="ms "> MasterCard </ option >
      </ select >
      < input type ="text" name =" card_num " width ="30 " />
      < input type ="text" name =" expiry_ date " />
      < input type =" submit " value =" Submit " />
    </ form >
  < script ><![CDATA[
        function welcome() {
          p_welcome.active();
          repeat = 0;
          checkFilled();
        }
          function mumble(gobj, maxprompts) {
           gobj.deactivate();
           p_mumble.active();
          checkFil led();
        }
```

300

303

305

302

TO FIG. 9B

FIG. 9A

```
        function _handle() {
          handle();
          checkFilled();
        }
        function checkFilled() {
          if (card_type.value == "") {
                p_card_type.active();
                g_card_types.activate(); return;
          }
          if (card_num.value =="") {
                p_card_num.active(); g_card_num.acti   vate(); return;
          }
          if (expiry_date.value == "") {
                p_expiry_data.active(); g_expiry_date.activate(); return;
          }
            p_content.activate();
           p_confirm.activate();
           confirmation.activate();
        }

          function confirmed(gobj) {
                  if (gobj.recogRes.text == "yes")
                          get_card_info.submit();
          }
          //
          // user codes start here
          //
          function handle() {

            if (get_card_info.card_type == "amex") {
               if (get_card_info.card_num.length != 15) {
                  prompt.speak ("amex should have 15 digits");
                  get_card_info.card_num = "";
               }
            } else
               if (get_card_info.card_num.length != 16)  {
                  prompt.speak ('visa and master should have 16 digits");
                  get_card_info.card_num = "";
               }
          }
        ]]>
      </script>
    </body>
```

FIG. 9B

```
<body>
    <form id="get_card_info" method="post" action="http://payment.asp"
      onactivate="welcome()">
      <prompt id="p_welcome">We now need your credit card</prompt>
      <prompt id="p_mumble">I didn't understand you</prompt>
      <prompt id="p_card_type" bargein="true">What credit card would you
use?</prompt>
      <prompt id="p_card_num" bargein="true">Please say the number</prompt>
      <prompt id="p_expiry_date" bargein="true">What is the expiration
date?</prompt>
      <prompt id="p_content">
        I have your  <value select="card_type" /><value select="card_num" />
   with expiration date <value select="expiry_date" />
      </prompt>
      <prompt id="p_confirm">Is this correct?</prompt>
      <reco id="g_get_card_info" onReco="_handle()"  onNoReco ="mumble(this)">
        <grammar    src   ="./gram/getPayment" />
        <bind target="card_type" value="/card/type" />
        <bind target="card_num" value="/card/number" />
        <bind target="expiry_date" value="/card/expr_date" />
      </reco>
      <reco id="confirmation" onReco ="confirmed(this)  onNoReco="mumble(this)" />
        <grammar src ="./gram#yesno"/>
      </reco >
      <select name="card_type">
        <option value="amex">American Express</option>
        <option value="visa">Visa</option>
        <option value="ms">MasterCard</option>
      </select>
      <input type="text" name="card_num" width="30" />
      <input type="text" name="expiry_date" />
      <input type="submit" value="Submit" />
    </form>
    <script><![CDATA[
        function welcome() {
          p_welcome.active();
          repeat = 0;
          checkFilled();
        }
        function mumble(gobj) {
          gobj.deactivate();
          p_mumble.active();
          checkFilled();
        }
        function _handle() {
          handle();
          checkFilled();
        }
```

405

TO FIG. 10B

FIG. 10A

```
        function checkFilled()   {
          if (card_type.value == "") {
                p_card_type.active();; do_field.activate(); return;
          }
          if (card_num.value =="") {
                p_card_num.active(); do_field.activate(); return;
          }
          if (expiry_date.value == "") {
                 p_expiry_data.active(); do_field.activate(); return;
          }
          p_content.activate();
          p_confirm.activate();
          confirmation.activate();
        }
        function confirmed(gobj) {
          if (gobj.recogRes.text == "yes")
                get_card_info.submit(gensml());
        }
        //
        // user codes start here
        //
          function handle() {
          if (field == get_card_info.card_num) {
             if (get_card_info.card_num.length != 15) {
                prompt.speak ("amex should have 15 digits");
                get_card_info.card_num = "";
             }
          } else
             if (get_card_info.card_num.length != 16)  {
                prompt.speak ("visa should have 15 digits");
                get_card_info.card_num = "";
             }
        }
          function gensml() {
                str = '<sml><credit_card type="';
                str += card_type.value; str += '"><number>';
                str += card_number.value; str += '</number><expire>';
                str += expiry_date.value; str +=
-'</expire></credit_card></sml>';
                return str;
        }
    ]]>
  </script>
</body>
```

FIG. 10B

SAMPLE ASP+ PAGE

```
<%@ Page language="Jscript" AutoEventWireup="false"
Inherits="Credit.Transaction" %>
<html><head>
<!-- ASPX page for both voice-only & multimodal credit card example -->
<script>
function handle() {
        if (field == get_card_info.card_num) {
           if (get_card_info.card_num.length != 15) {
             prompt.speak ("amex should have 15 digits");
             get_card_info.card_num = "";
           }
        } else
           if (get_card_info.card_num.length != 16)  {
             prompt.speak ("visa should have 15 digits");
             get_card_info.card_num = "";
           }
      }
function gensml() {
      str = '<sml><credit_card><card_type>';
      str += card_type.value; str += '</card_type><number>';
      str += card_number.value; str += '</number><expire>';
      str += expiry_date.value; str += '</expire></credit_card></sml>';
      return str;
}
</script>
<script runat="server">
function Page_Load (obj, args) {
      if (PostBack) {
         validator = new System.Speech.SMLValidator("./CreditSDL.xml");
         dsml = validator.Evaluate(args);
         Navigate(ChoosePage(dsml));
      } else {
        // initialize fields with args
      }
}
</script>
</head>
<body>
<speech:form id="get_card_info" style="system_initiative"
      prompt="./prompt/getPayment" onsubmit="gensml()">
  <speech:choice name="card_type" prompt="What credit card would you
use?"
      grammar="./gram#card_types" onPhraseFinish="handle()"
      <option>American Express</option>
      <option>Visa</option>
      <option>Mastercard </option>
  </speech:choice>
  <speech:textbox name="card_number" prompt="Please say the number"
      grammar="./gram#digits" onPhraseFinish="handle()">
  <speech:textbox name="expiry_date" prompt="What is the expiration
date? "
      grammar="./gram#dates" onPhraseFinish="handle()"/>

</speech:form>
</body>
</html>
```

FIG.11

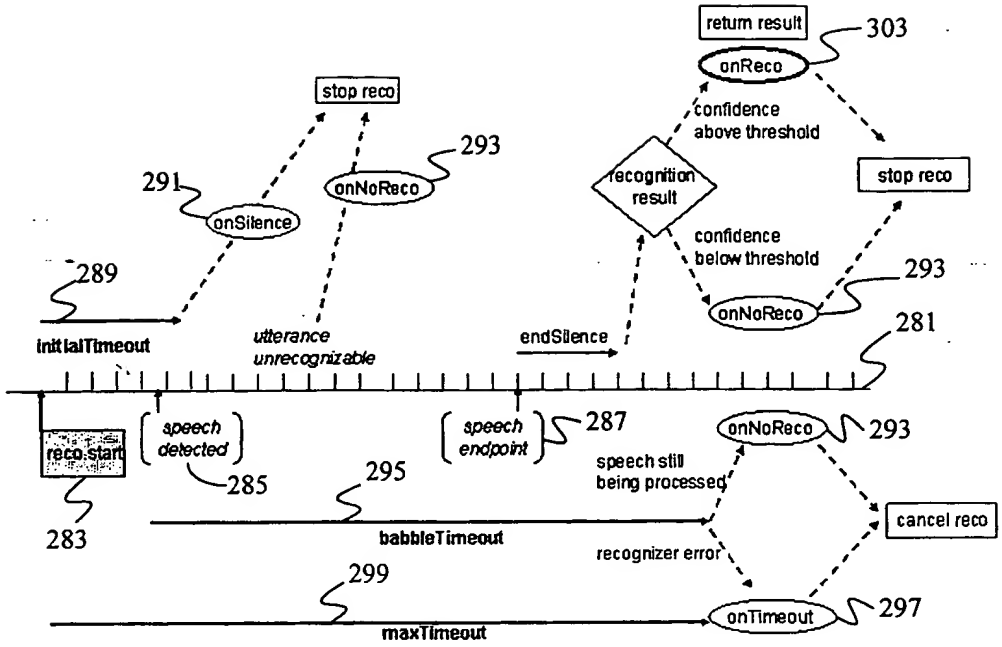
return result
303
onReco
stop reco
confidence
above threshold
293
291
onNoReco
recognition
result
stop reco
onSilence
confidence
below threshold
289
293
onNoReco
281
initialTimeout
utterance
unrecognizable
endSilence
speech
detected
speech
endpoint
287
onNoReco
293
reco.start
285
speech still
being processed
295
cancel reco
283
babbleTimeout
recognizer error
299
onTimeout
297
maxTimeout

FIG. 12

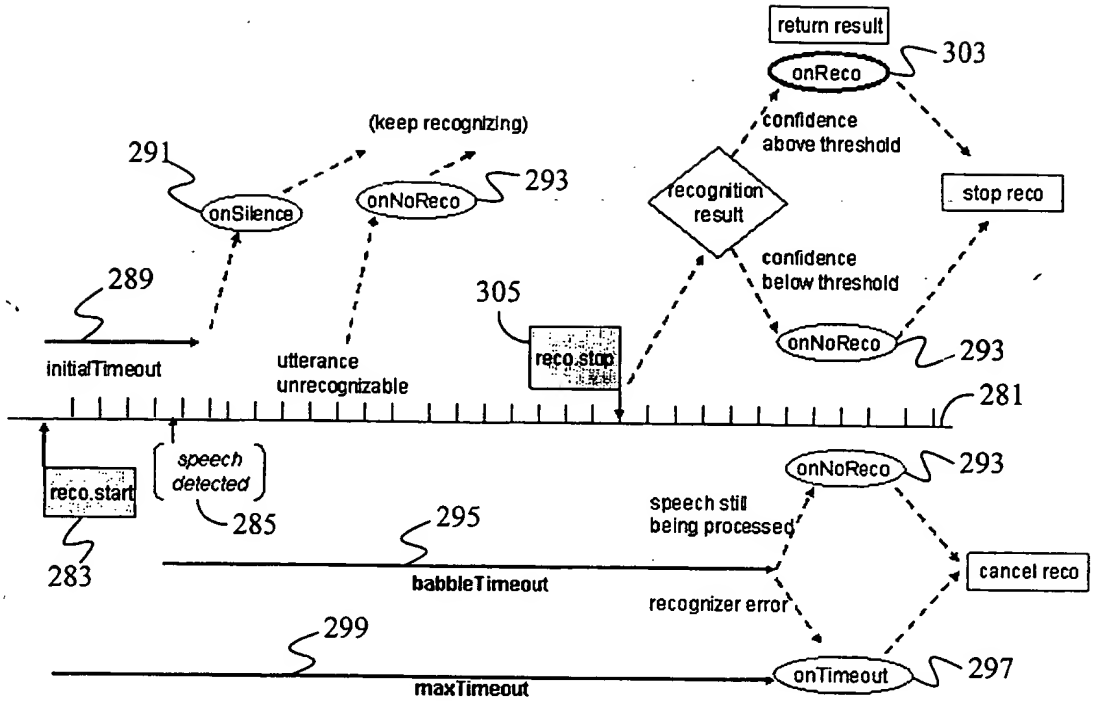
return result
303
onReco
confidence
above threshold
(keep recognizing)
291
onSilence
onNoReco
293
recognition
result
stop reco
confidence
below threshold
289
305
reco.stop
initialTimeout
utterance
unrecognizable
onNoReco
293
281
onNoReco
293
reco.start
speech
detected
285
speech still
being processed
295
cancel reco
283
babbleTimeout
recognizer error
299
onTimeout
297
maxTimeout

FIG. 13

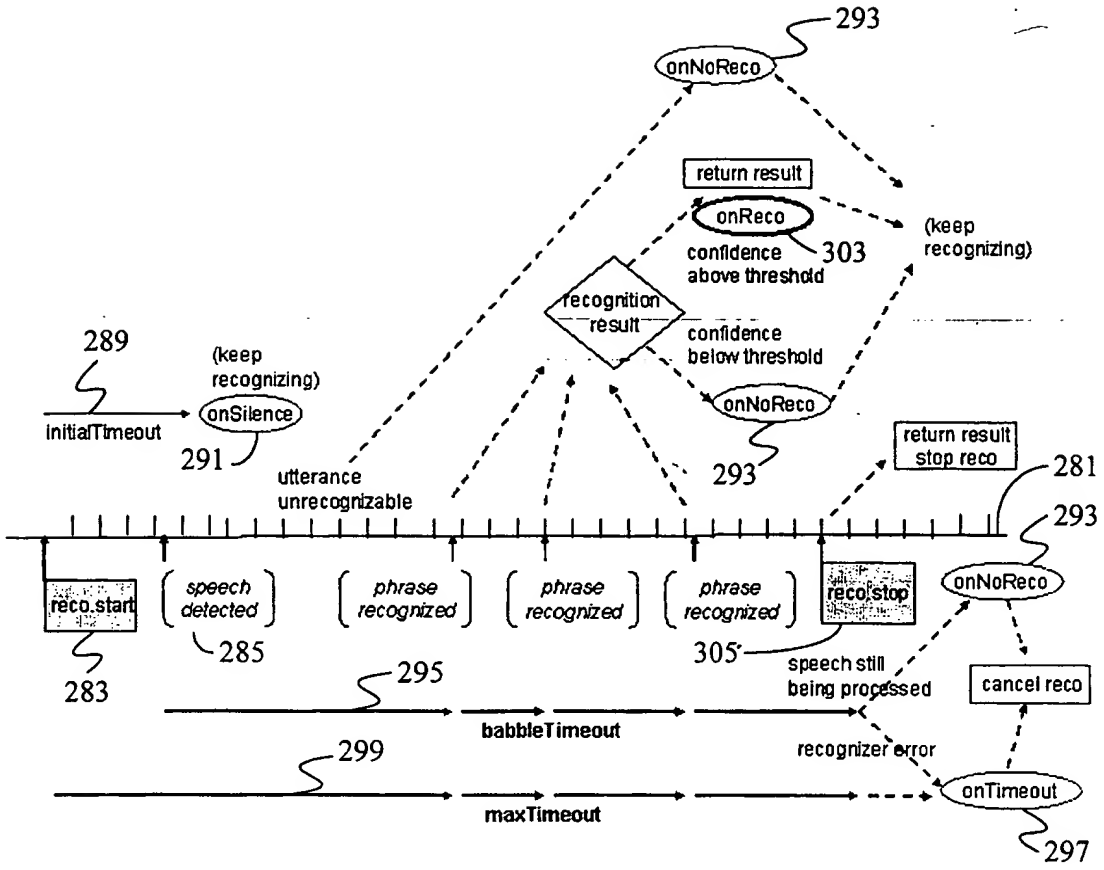
293
onNoReco
return result
onReco
303
confidence
above threshold
(keep
recognizing)
recognition
result
confidence
below threshold
289
(keep
recognizing)
initialTimeout
onSilence
291
onNoReco
293
utterance
unrecognizable
return result
stop reco
281
293
reco.start
speech
detected
phrase
recognized
phrase
recognized
phrase
recognized
reco.stop
onNoReco
283
285
305
speech still
being processed
cancel reco
295
babbleTimeout
recognizer error
299
maxTimeout
onTimeout
297

FIG. 14